

1/4" JOINT MATERIAL TO BE USED AT TRANSVERSE JOINTS IN TOP AND BOTTOM SLABS AND SIDEWALLS.

TRANSVERSE JOINTS TO BE CONSTRUCTED PERPENDICULAR TO FLOW LINE AND AT RIGHT ANGLES TO CENTERLINE OF BOX.

GENERAL NOTES:

USE TRANSVERSE EXPANSION JOINTS IN ALL NEW CULVERTS 75 FEET OR MORE IN LENGTH BETWEEN HEADWALLS, AND IN EXTENSIONS WHERE BOTH OF THE TWO FOLLOWING CONDITIONS EXIST: TOTAL LENGTH OF COMPLETED CULVERT IS 75 FEET OR MORE AND LENGTH OF SINGLE EXTENSION IS 15 FEET OR MORE.

ADDITIONAL EXPANSION JOINTS SHALL BE USED IF REQUIRED TO HOLD THESE CUT SECTIONS OF BARREL TO A MAXIMUM OF 50 FEET IN LENGTH.

UNEQUAL LENGTHS OF BARREL SECTIONS SHALL BE USED. IF NECESSARY, IN CULVERTS HAVING "BROKEN-BACKS" OR "DOG-LEGS" THAT JOINTS WILL NOT BE LOCATED WITHIN THAT PORTIONS WHICH IS 5 FEET UPSTREAM OR 10 FEET DOWNSTREAM FROM POINT OF DEFLECTION.

ALL LONGITUDINAL REINFORCEMENT SHALL BE PLACED WITH ENDS APPROXIMATELY 1 1/2" FROM CENTER OF EXPANSION JOINTS.

WHEN DESIGNING EXTENSIONS, SEE STANDARD DRAWING 703.38 AND PREPARE SPECIAL DRAWING WHEN REQUIRED.

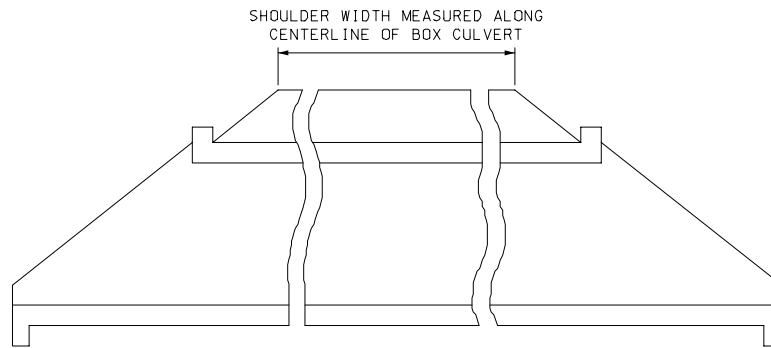
COST OF TRANSVERSE EXPANSION JOINTS, COMPLETE IN PLACE, TO BE INCLUDED IN THE UNIT PRICE BID FOR CLASS "B" CONCRETE.

NOTE: SECTIONS TO BE LETTERED CONSECUTIVELY BEGINNING FROM UPSTREAM HEADWALL. SECTIONS NOT NECESSARILY UNDER SOME PART OF FILL AS SHOWN IN ILLUSTRATION. SECTION c & d TO BE OF EQUAL LENGTH. ALSO, WHERE POSSIBLE MAKE SECTION b THE SAME LENGTH AS SECTION e AND SECTION a THE SAME LENGTH AS SECTION f. ALSO, SEE GENERAL NOTES.

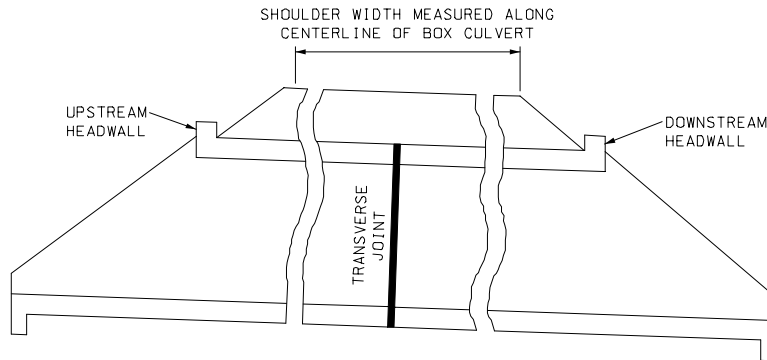
MODIFIED SECTIONS: SECTIONS UNDER TRAVELED WAY TO BE DESIGNED FOR HEIGHT OF FILL AT CENTERLINE OF TRAVELED WAY, EXCEPT WHERE THE HEIGHT OF FILL AT THE SHOULDER LINES VARIES MORE THAN 5'-0". IN SUCH CASES, THE SECTION OF SECTIONS SHALL BE DESIGNED FOR THE HEIGHT OF FILL AT A POINT DETERMINED AS SHOWN FOR "SECTION UNDER SLOPES."

SECTIONS UNDER SLOPES TO BE DESIGNED FOR THE HEIGHT OF FILL MEASURED AT A POINT TO BE DETERMINED AS SHOWN ABOVE.

CHAPTER IX HYDRAULICS AND DRAINAGE



NOTE: CULVERT TO BE DESIGNED FOR HEIGHT OF FILL AT CENTERLINE OF TRAVELED WAY EXCEPT WHERE THE HEIGHT OF FILL AT THE SHOULDER LINE VARIES MORE THAN 5'-0". IN SUCH CASES, DESIGN FOR THE HEIGHT OF FILL AT A POINT DETERMINED BY THE METHOD SHOWN FOR SECTIONS UNDER SLOPES AS SET OUT IN THE DRAWING FOR CULVERTS OVER 100' LONG.



NOTE: TRANSVERSE JOINT TO BE PLACED IN CENTER OF CULVERT SECTIONS TO BE DESIGNED FOR HEIGHT OF FILL AT CENTERLINE OF TRAVELED WAY EXCEPT WHERE THE HEIGHT OF FILL AT THE SHOULDER LINE VARIES MORE THAN 5'-0". IN SUCH CASES EACH SECTION SHALL BE DESIGNED FOR THE HEIGHT OF FILL MEASURED AT POINTS TO BE DETERMINED BY THE METHOD SHOWN FOR SECTIONS UNDER SLOPES AS SET OUT IN THE DRAWING FOR CULVERTS OVER 100' LONG.

GENERAL NOTES:

USE TRANSVERSE EXPANSION JOINTS IN ALL NEW CULVERTS 75 FT. OR MORE IN LENGTH BETWEEN HEADWALLS; ALSO IN EXTENSIONS WHERE BOTH OF THE TWO FOLLOWING CONDITIONS EXIST: TOTAL LENGTH OF COMPLETED CULVERT IS 75 FT. OR MORE AND LENGTH OF SINGLE EXTENSION IS 15 FT. OR MORE.

ADDITIONAL EXPANSION JOINTS SHALL BE USED IF REQUIRED TO HOLD THESE CUT SECTIONS OF BARREL TO A MAXIMUM OF 50 FT. IN LENGTH.

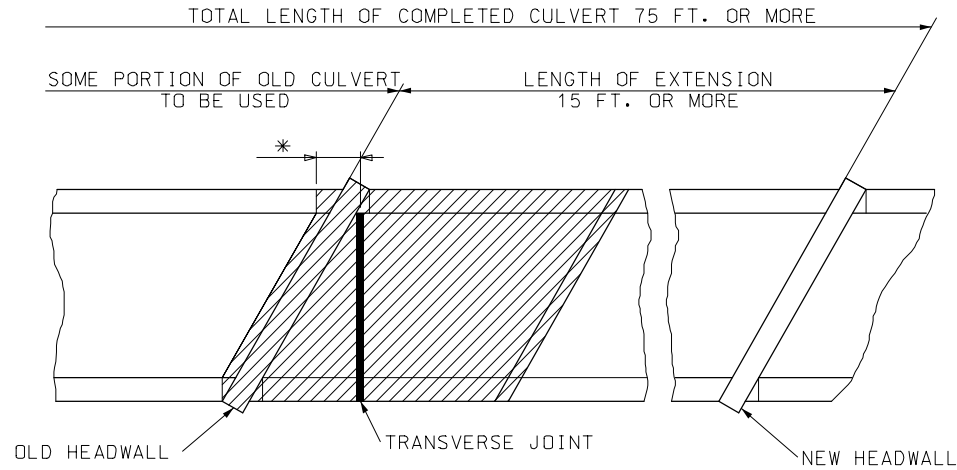
UNEQUAL LENGTHS OF BARREL SECTIONS SHALL BE USED, IF NECESSARY, IN CULVERTS HAVING "BROKEN-BACKS" OR "DOG-LEGS" SO THAT JOINTS WILL NOT BE LOCATED WITHIN THAT PORTION WHICH IS 5 FT. UPSTREAM OR 10 FT. DOWNSTREAM FROM POINT OF DEFLECTION.

ALL LONGITUDINAL REINFORCEMENT SHALL BE PLACED WITH ENDS APPROXIMATELY 1½" FROM CENTER OF EXPANSION JOINTS.

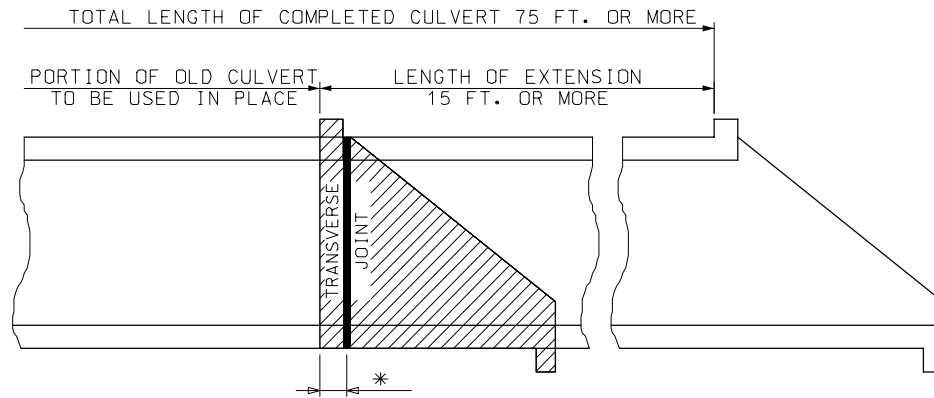
WHEN DESIGNING EXTENSIONS, SEE STD. DRAWING 703.38 AND PREPARE SPECIAL DRAWING WHEN REQUIRED.

COST OF TRANSVERSE EXPANSION JOINTS, COMPLETE IN PLACE, TO BE INCLUDED IN THE UNIT PRICE BID FOR CLASS "B" CONCRETE.

**Box Culverts built in Sections and Modified Culverts
(For Reference Only)**



SKEW-PLAN VIEW



NO SKEW-PROFILE VIEW

* FOR CUTTING DETAIL, SEE STANDARD PLAN 703.38

GENERAL NOTES:

USE TRANSVERSE EXPANSION JOINTS IN ALL NEW CULVERTS 80 FEET OR MORE IN LENGTH BETWEEN HEADWALLS. ALSO IN EXTENSIONS WHERE BOTH OF THE TWO FOLLOWING CONDITIONS EXIST: TOTAL LENGTH OF COMPLETED CULVERT IS 80 FEET OR MORE AND LENGTH OF SINGLE EXTENSION IS 15 FEET OR MORE.

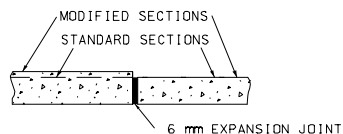
ADDITIONAL EXPANSION JOINTS SHALL BE USED IF REQUIRED TO HOLD THESE CUT SECTIONS OF BARREL TO A MAXIMUM OF 50 FEET IN LENGTH.

UNEQUAL LENGTHS OF BARREL SECTIONS SHALL BE USED, IF NECESSARY, IN CULVERTS HAVING "BROKEN-BACKS" OR "DOG-LEGS" SO THAT JOINTS WILL NOT BE LOCATED WITHIN THAT PORTION WHICH IS 5 FEET UPSTREAM OR 10 FEET DOWNSTREAM FROM POINT OF DEFLECTION.

ALL LONGITUDINAL REINFORCEMENT SHALL BE PLACED WITH ENDS APPROXIMATELY 1-1/2" FROM CENTER OF EXPANSION JOINTS.

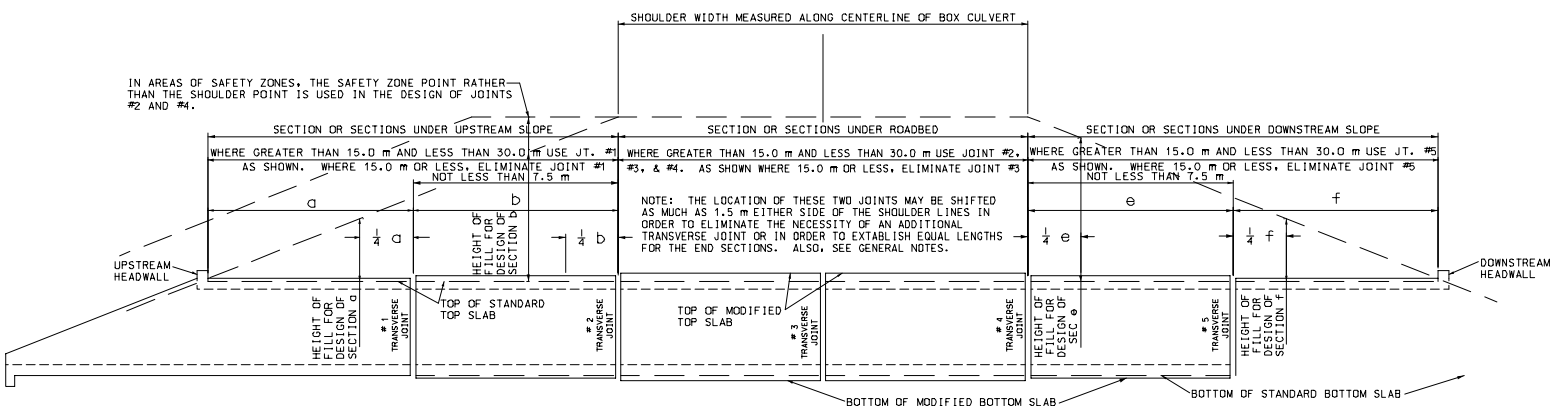
WHEN DESIGNING EXTENSION, SEE STANDARD DRAWING 703.38 AND PREPARE SPECIAL DRAWING WHEN REQUIRED.

COST OF TRANSVERSE EXPANSION JOINTS, COMPLETE IN PLACE, TO BE INCLUDED IN THE UNIT PRICE BID FOR CLASS B CONCRETE.



6 mm JOINT MATERIAL TO BE USED AT TRANSVERSE JOINTS IN TOP AND BOTTOM SLABS AND SIDEWALLS.

TRANSVERSE JOINTS TO BE CONSTRUCTED PERPENDICULAR TO FLOW LINE AND AT RIGHT ANGLES TO CENTERLINE OF BOX.



GENERAL NOTES

USE TRANSVERSE EXPANSION JOINTS IN ALL NEW CULVERTS 22.5 m OR MORE IN LENGTH BETWEEN HEADWALLS; ALSO IN EXTENSIONS WHERE BOTH OF THE TWO FOLLOWING CONDITIONS EXIST: TOTAL LENGTH OF COMPLETED CULVERT IS 22.5 m OR MORE AND LENGTH OF SINGLE EXTENSION IS 4.5 m OR MORE.

ADDITIONAL EXPANSION JOINTS SHALL BE USED IF REQUIRED TO HOLD THESE CUT SECTIONS OF BARREL TO A MAXIMUM OF 15.0 m IN LENGTH.

UNEQUAL LENGTHS OF BARREL SECTIONS SHALL BE USED, IF NECESSARY, IN CULVERTS HAVING "BROKEN-BACKS" OR "DOG-LEGS" SO THAT JOINTS WILL NOT BE LOCATED WITHIN THAT PORTION WHICH IS 1.5 m UPSTREAM OR 3.0 m DOWNSTREAM FROM POINT OF DEFLECTION.

ALL LONGITUDINAL REINFORCEMENT SHALL BE PLACED WITH ENDS APPROXIMATELY 40 mm FROM CENTER OF EXPANSION JOINTS.

WHEN DESIGNING EXTENSIONS, SEE STANDARD DRAWING M703.38 AND PREPARE SPECIAL DRAWING WHEN REQUIRED.

COST OF TRANSVERSE EXPANSION JOINTS, COMPLETE IN PLACE, TO BE INCLUDED IN THE UNIT PRICE BID FOR CLASS "B" CONCRETE.

NOTE: SECTIONS TO BE LETTERED CONSECUTIVELY BEGINNING FROM UPSTREAM HEADWALL. SECTIONS NOT NECESSARILY UNDER SOME PART OF FILL AS SHOWN IN ILLUSTRATION. SECTION c & d TO BE OF EQUAL LENGTH. ALSO, WHERE POSSIBLE MAKE SECTION b THE SAME LENGTH AS SECTION e AND SECTION a THE SAME LENGTH AS SECTION f. ALSO, SEE GENERAL NOTES.

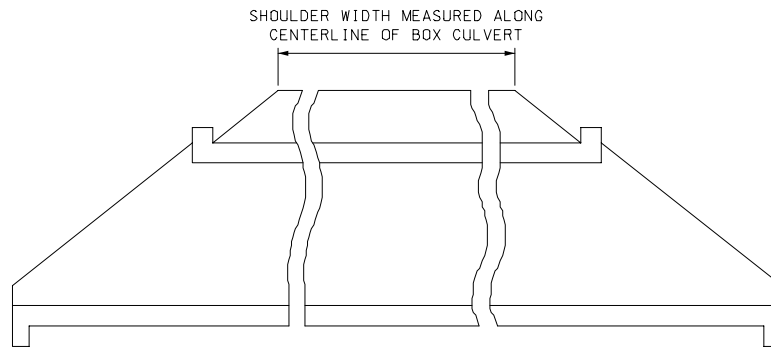
MODIFIED SECTIONS: SECTIONS UNDER TRAVELED WAY TO BE DESIGNED FOR HEIGHT OF FILL AT CENTERLINE OF TRAVELED WAY. EXCEPT WHERE THE HEIGHT OF FILL AT THE SHOULDER LINES VARIES MORE THAN 1.5 m. IN SUCH CASES, THE SECTION OR SECTIONS SHALL BE DESIGNED FOR THE HEIGHT OF FILL AT A POINT DETERMINED AS SHOWN FOR "SECTION UNDER SLOPES."

SECTIONS UNDER SLOPES TO BE DESIGNED FOR THE HEIGHT OF FILL MEASURED AT A POINT TO BE DETERMINED AS SHOWN ABOVE.

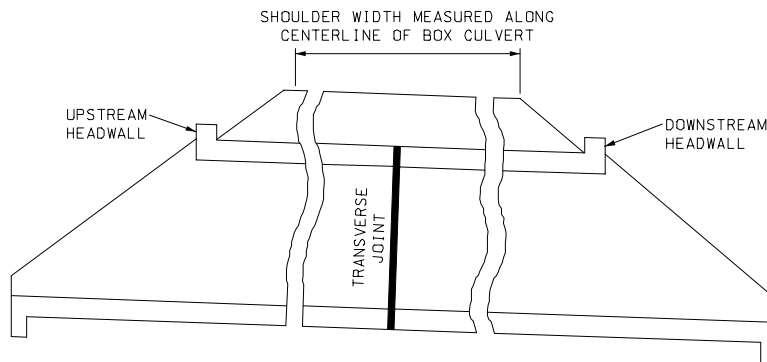
Box Culverts Built In Sections and Modified Culverts (For Reference Only)

Figure 9-10.2

CHAPTER IX HYDRAULICS AND DRAINAGE



NOTE: CULVERT TO BE DESIGNED FOR HEIGHT OF FILL AT CENTERLINE OF TRAVELED WAY EXCEPT WHERE THE HEIGHT OF FILL AT THE SHOULDER LINE VARIES MORE THAN 1.5 m. IN SUCH CASES, DESIGN FOR THE HEIGHT OF FILL AT A POINT DETERMINED BY THE METHOD SHOWN FOR SECTIONS UNDER SLOPES AS SET OUT IN THE DRAWING FOR CULVERTS OVER 30.0 m LONG.



NOTE: TRANSVERSE JOINT TO BE PLACED IN CENTER OF CULVERT SECTIONS TO BE DESIGNED FOR HEIGHT OF FILL AT CENTERLINE OF TRAVELED WAY EXCEPT WHERE THE HEIGHT OF FILL AT THE SHOULDER LINE VARIES MORE THAN 1.5 m. IN SUCH CASES EACH SECTION SHALL BE DESIGNED FOR THE HEIGHT OF FILL MEASURED AT POINTS TO BE DETERMINED BY THE METHOD SHOWN FOR SECTIONS UNDER SLOPES AS SET OUT IN THE DRAWING FOR CULVERTS OVER 30.0 m LONG.

GENERAL NOTES:

USE TRANSVERSE EXPANSION JOINTS IN ALL NEW CULVERTS 22.5 m OR MORE IN LENGTH BETWEEN HEADWALLS; ALSO IN EXTENSIONS WHERE BOTH OF THE TWO FOLLOWING CONDITIONS EXIST: TOTAL LENGTH OF COMPLETED CULVERT IS 22.5 m OR MORE AND LENGTH OF SINGLE EXTENSION IS 4.5 m OR MORE.

ADDITIONAL EXPANSION JOINTS SHALL BE USED IF REQUIRED TO HOLD THESE CUT SECTIONS OF BARREL TO A MAXIMUM OF 15.0 m IN LENGTH.

UNEQUAL LENGTHS OF BARREL SECTIONS SHALL BE USED, IF NECESSARY, IN CULVERTS HAVING "BROKEN-BACKS" OR "DOG-LEGS" SO THAT JOINTS WILL NOT BE LOCATED WITHIN THAT PORTION WHICH IS 1.5 m UPSTREAM OR 3.0 m DOWNSTREAM FROM POINT OF DEFLECTION.

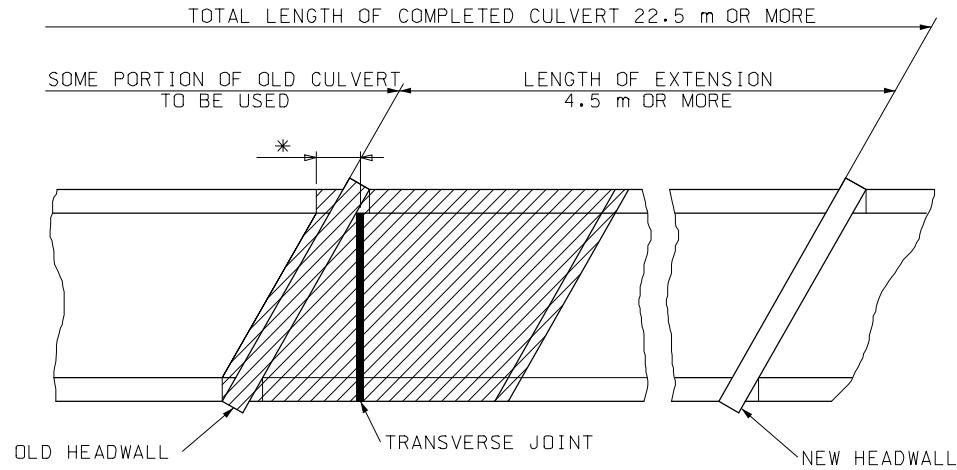
ALL LONGITUDINAL REINFORCEMENT SHALL BE PLACED WITH ENDS APPROXIMATELY 40 mm FROM CENTER OF EXPANSION JOINTS.

WHEN DESIGNING EXTENSIONS, SEE STANDARD DRAWING M703.38 AND PREPARE SPECIAL DRAWING WHEN REQUIRED.

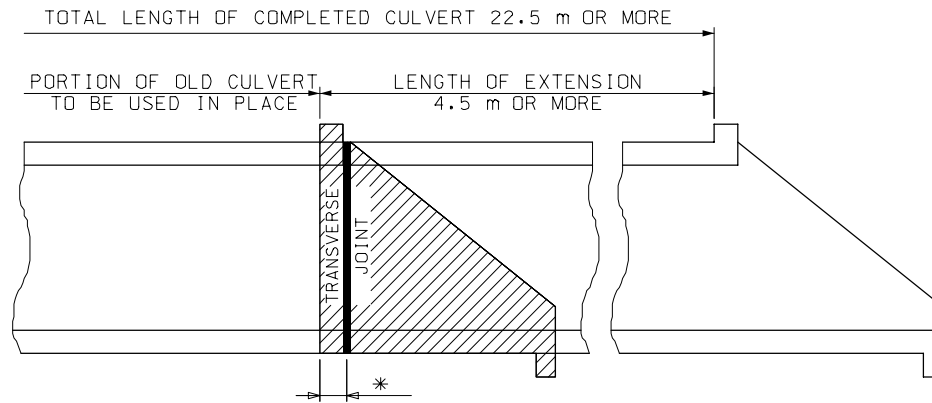
COST OF TRANSVERSE EXPANSION JOINTS, COMPLETE IN PLACE, TO BE INCLUDED IN THE UNIT PRICE BID FOR CLASS "B" CONCRETE.

Box Culverts Built In Sections and Modified Culverts (For Reference Only)

Figure 9-10.2



SKEW-PLAN VIEW



NO SKEW-PROFILE VIEW

* FOR CUTTING DETAIL, SEE STANDARD PLAN 703.38

GENERAL NOTES:

USE TRANSVERSE EXPANSION JOINTS IN ALL NEW CULVERTS 22.5 m OR MORE IN LENGTH BETWEEN HEADWALLS. ALSO IN EXTENSIONS WHERE BOTH OF THE TWO FOLLOWING CONDITIONS EXIST: TOTAL LENGTH OF COMPLETED CULVERT IS 22.5 m OF MORE AND LENGTH OF SINGLE EXTENSION IS 4.5 m OR MORE.

ADDITIONAL EXPANSION JOINTS SHALL BE USED IF REQUIRED TO HOLD THESE CUT SECTIONS OF BARREL TO A MAXIMUM OF 15.0 m IN LENGTH.

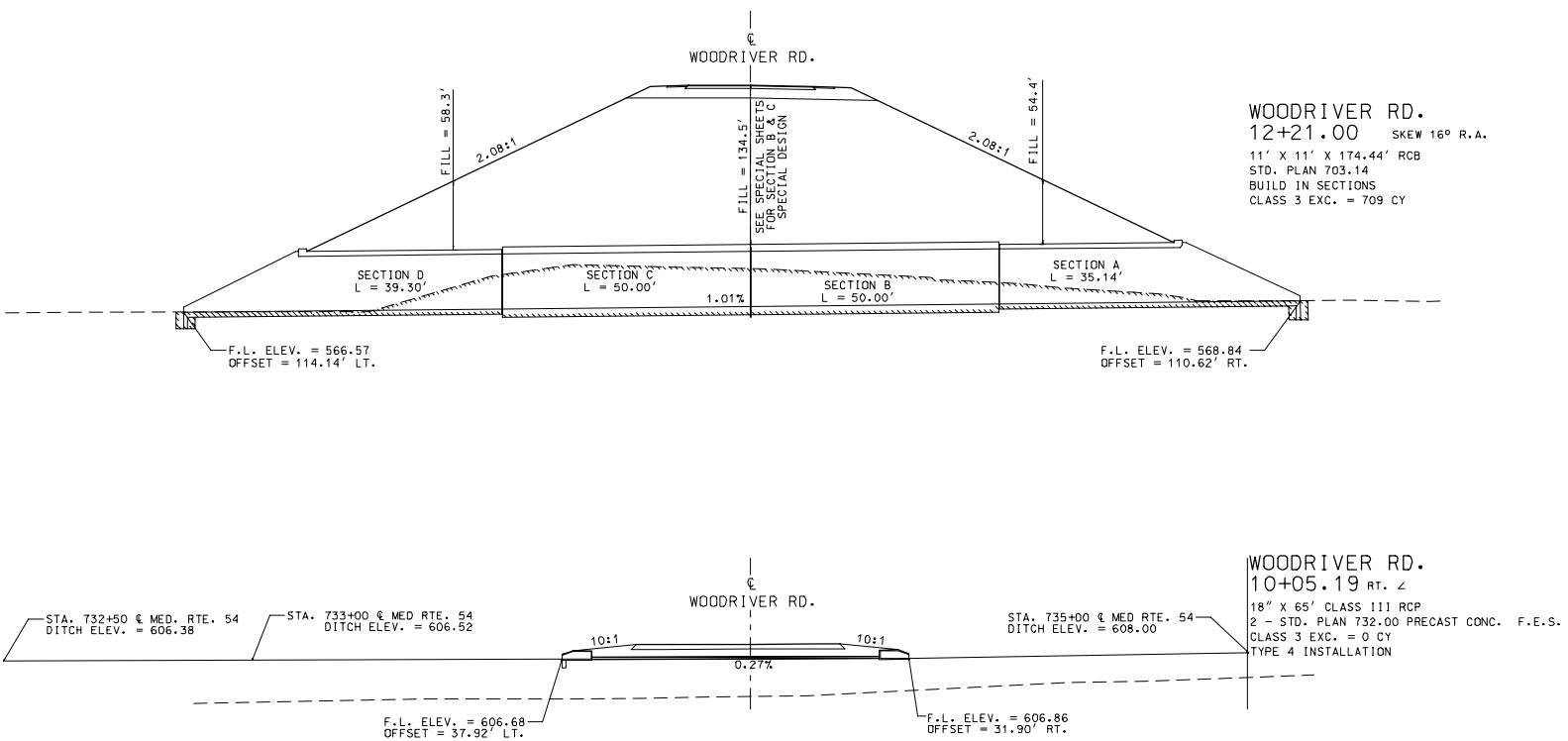
UNEQUAL LENGTHS OF BARREL SECTIONS SHALL BE USED, IF NECESSARY, IN CULVERTS HAVING "BROKEN-BACKS" OR "DOG-LEGS" SO THAT JOINTS WILL NOT BE LOCATED WITHIN THAT PORTION WHICH IS 1.5 m UPSTREAM OR 3.0 m DOWNSTREAM FROM POINT OF DEFLECTION.

ALL LONGITUDINAL REINFORCEMENT SHALL BE PLACED WITH ENDS APPROXIMATELY 40 mm FROM CENTER OF EXPANSION JOINTS.

WHEN DESIGNING EXTENSION, SEE STANDARD DRAWING 703.38 AND PREPARE SPECIAL DRAWING WHEN REQUIRED.

COST OF TRANSVERSE EXPANSION JOINTS, COMPLETE IN PLACE, TO BE INCLUDED IN THE UNIT PRICE BID FOR CLASS B CONCRETE.

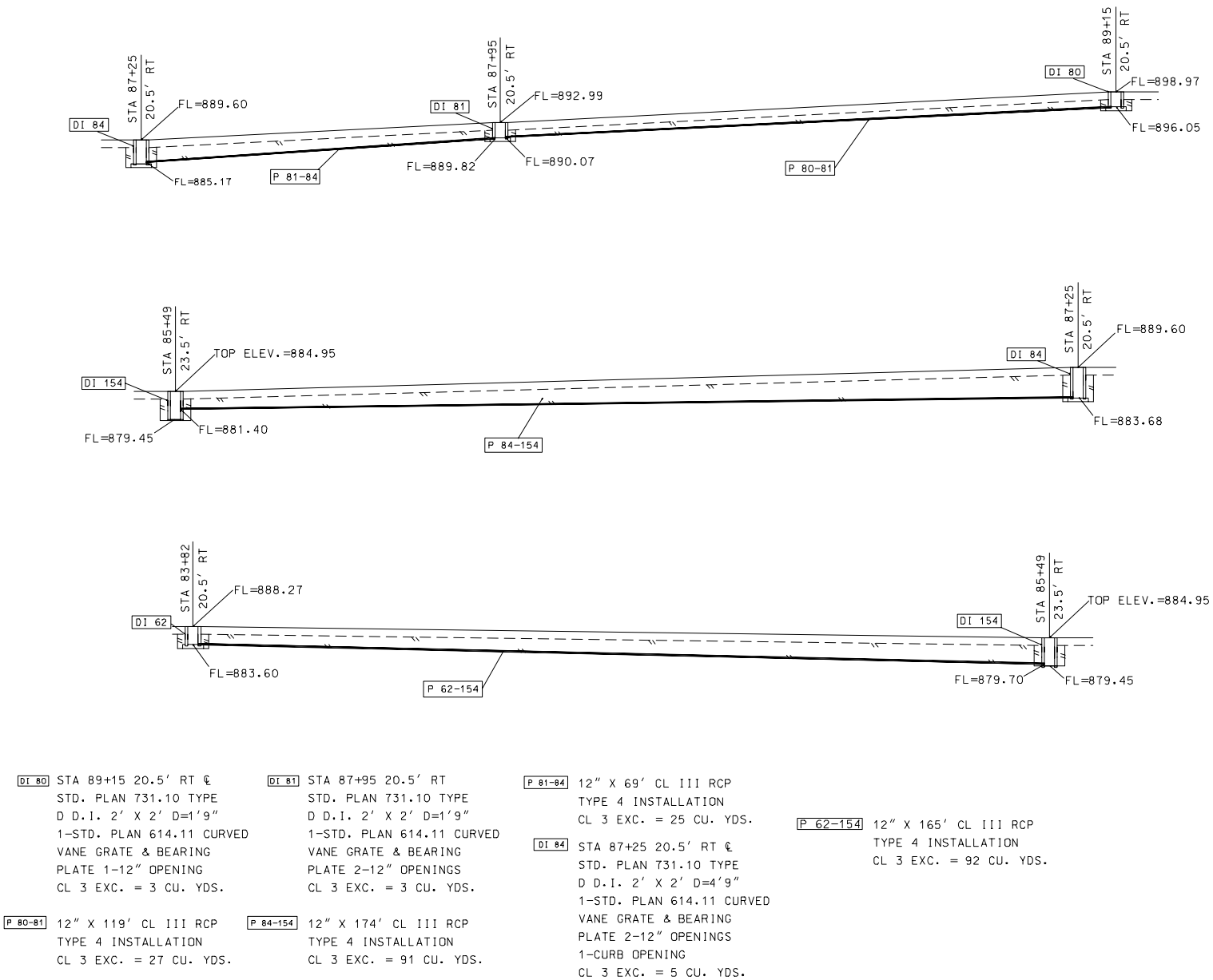
CHAPTER IX
HYDRAULICS AND DRAINAGE



Box Culverts Built In Sections and Modified Culverts
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Figure 9-10.2

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